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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/748,812      | 12/30/2003  | Peter Michael Finnigan | 125636-1            | 7164             |

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GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER

LE, JOHN H

ART UNIT PAPER NUMBER

2863

DATE MAILED: 10/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/748,812

Applicant(s)

FINNIGAN ET AL.

Examiner

John H. Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 19 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-9 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9, 11 and 18 is/are allowed.
- 6) ☒ Claim(s) 12, 13 and 15-17 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Response to Amendment***

1. This office action is in response to applicant's response received on 08/19/2005.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 12-13, 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Martin (USP 5,545,007).

Regarding claim 12, Martin discloses a method for controlling blade tip clearance in a turbine having a blade (6) rotating within a shroud (8) having a plurality of shroud segments (10) (e.g. Fig.1, Col.3, lines 7-11), the method comprising obtaining a turbine parameter (38); generating a tip clearance prediction (desired rotor tip clearance, Figs.1, 4) in response to turbine cycle parameters (38)(e.g. Figs.1, 4); generating at least one command signal (correct signal) in response to said turbine parameter and said tip clearance prediction; providing said command signal to an actuator (12) to adjust a position of at least one of said shroud segments (e.g. Figs. 1, 4, Col.5, lines 29-47, Col.6, lines 21-31).

Regarding claim 13, Martin discloses said at least one command signal includes a plurality of command signals, said providing including providing said

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command signals to a plurality of actuators to adjust a position of a plurality of said shroud segments (a plurality of corrective voltage is continuously to apply to connector 16 to adjust position of segments, Col5, lines 29-47).

Regarding claim 15, Martin discloses said generating said tip clearance prediction (desired rotor tip clearance, Figs.1, 4) is preformed in real time (e.g. Col.3, lines 15-17).

Regarding claim 16, Martin discloses updating a model (engine operating conditions, Fig.4) used for generating said tip clearance prediction (desired rotor tip clearance, Figs.1, 4) in response to environmental changes (temperature changes).

Regarding claim 17, Martin discloses updating a model (engine operating conditions, Fig.4) used for generating said tip clearance prediction (desired rotor tip clearance, Figs.1, 4) in response to engine degradation (rotational velocity changes, temperatures changes, abstract).

***Allowable Subject Matter***

4. Claims 1-9, 11, and 18 are allowed.

Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 1, none of the prior art of record teaches or suggests the combination of a system for controlling blade tip clearance in a turbine, the

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system comprising: a sensor for sensing a turbine parameter and generating a sensor signal representative of said turbine parameter; a modeling module generating a tip clearance prediction in response to turbine cycle parameters; a controller receiving said sensor signal and said tip clearance prediction and generating at least one command signal; said actuators including at least one actuator receiving said command signal and adjusting a position of at least one of said shroud segments in response to said command signal. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 14, none of the prior art of record teaches or suggests the combination of a method for controlling blade tip clearance in a turbine having a blade rotating within a shroud having a plurality of shroud segments, the method comprising obtaining a turbine parameter, wherein said obtaining a turbine parameter includes receiving a sensed parameter and deriving an actual turbine parameter in response to said sensed parameter; generating a tip clearance prediction in response to turbine cycle parameters; generating at least one command signal in response to said turbine parameter and said tip clearance prediction; providing said command signal to an actuator to adjust a position of at least one of said shroud segments. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 18, none of the prior art of record teaches or suggests the combination of a system for controlling blade tip clearance in a turbine, the system comprising: a stator including a shroud having a plurality of shroud segments; a rotor including a blade rotatable within said shroud; an actuator assembly positioned radially around said shroud, said actuator assembly including a plurality of actuators; a sensor for sensing a turbine parameter and generating a sensor signal representative of said turbine parameter; a modeling module generating a tip clearance prediction in response to turbine cycle parameters; a controller receiving said sensor signal and said tip clearance prediction and generating at least one command signal; said actuators including at least one actuator receiving said command signal and adjusting a position of at least one of said shroud segments in response to said command signal, wherein said actuator includes an inflatable bellows in fluid communication with a pump, said command signal being applied to said pump to control pressure of said inflatable bellows. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

### ***Response to Arguments***

5. Applicant's arguments filed 08/19/2005 have been fully considered but they are not persuasive.

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-Applicant argues that the prior did not teach, "clearance control based upon a sensed turbine parameter and a predicted tip clearance" as cited in claim 1.

Examiner agrees, therefore claims 1-9 and 11 are allowed.

-Applicant argues that the prior did not teach, "the clearance control based upon a sensed turbine parameter or even a predicted tip clearance" as cited in claim 12.

Examiner position is that Martin teaches the clearance control based upon a predicted tip clearance (desired rotor tip clearance, Figs. 1, 4) as discussed above.

Examiner position is that claim 12 does not include limitation "a sensed turbine parameter". Therefore, the argument of claim 12 is improper.

#### ***Contact Information***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H. Le whose telephone number is 571 272 2275. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571 272 2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John H. Le

Patent Examiner-Group 2863

October 12, 2005

**BRYAN BUI**  
**PRIMARY EXAMINER**

